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EVALUATION OF WATER QUALITY ROLE ON ENVIRONMENTAL IMPACT ASSESSMENT STUDY

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ABSTRACT

The Aim of the present study was to know the water quality role in the study area. Water is a vital natural resource which forms the basis of all life. We depend on water for irrigation, industry, domestic needs. The study area is near power house kothagudem area. The thermal plant uses 15000 tonnes of coal and discharges 5000tonnes of fly ash and bottom ash daily to the disposal site. The waste is dumped into a dam founded on metamorphic rock. However the waste hills formed, the water level reaches the ground surface. Ultimately adversely affecting the quality of ground and surface waters. Once the ground water is contaminated, its quality cannot be restored by stopping the pollutants from the source, its therefore becomes imperative to regularity monitor the quality of ground water and surface water and to device ways and mean to protect it. Contamination of ground water and surface water by domestic, industrial effluents and agricultural activity is serious problem faced by developing areas. Burning coal produces huge quantities of toxic waste which is stored in large coal ash ponds and ash dump sites. these coal waste impoundments are long term hazards to local communities and water supply as they can break, flood or seep into groundwater. keeping this in view the present study has been attempted. The present study was under taken to ascertain groundwater pollution of part of kothagudem town. Groundwater and surface samples were collected from predetermined locations and analysed for physical and chemical parameters. the data and the results of the investigation area are presented and discussed.

Key words: Water quality, EIA, Fly ash, physical and chemical parameters.

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1. INTRODUCTION

In any country, electricity is the major energy source for domestic, industrial and agricultural fields. For India, the unreliability of the monsoon & the uncertainty of hydel power, the meagre oil reserves, the problems associated with the safety and disposal of nuclear waste and the high technology needed for tapping non- conventional energy resources single out coal as the primary and principal source of electricity. kothagudem thermal power plant is an existing 1680 mw coal plant at Khammam district in Telangana India. The Telangana government has decided to utilise the vacant space at three existing coal plants to generate an additional 2400 MW of power project, and the kothagudem thermal power plant, each of which would add 800MW.

Singarani collieries company Limited (SCCL) has been exploiting coal for more than t115 years. Out of 470Km long pranahita Godavari Valley coalfield, the 350Km sector lying mostly in the south Indian state of Telangana. SCCL produce about 10% of the country's coal production and 76% of its production is dispatched to the coal based on thermal power plant in Maharashtra, Telangana and Karnataka. The remaining part of SCCL's coal production is supplied to the cement companies and other industries. The baseline environment quality represents the background environmental scenario of various environmental component during the study period.

2. DESCRIPTION OF STUDY AREA

2.1. Topography

The study area is located at kothagudem of Khammam district in Telangana. The area is covered in part of survey of India Topographical sheet Nos. 65 C/6,7,10 and 11. The study area is well connected to kothagudem(5km) and the Khammam (80km),the district head quarters by the state highways. The study area is parts of the district are mainly hilly, Godavari, Tungabhadra and Khammam has the largest area under forests.

2.2. Rainfall and Temperature

Study area has a tropical climate. The summer here have a good deal of rainfall while the winters have very little. The average annual temperature is 28.1°c.precipitation here averages 1046 mm. the difference in precipitation between the driest month and the wettest month is 281 mm .throughout the year, temperatures vary by 112°c.the diversity of the physical features results in a corresponding diversity of climate.

3. STUDY OBJECTIVES

a) Collecting of water samples.

b) Physio-chemical analysis of water samples for estimation of water quality.

4. METHODOLOGY

The study area divided into 10 parts. Total 10 water samples have been collected from different locations.4 surface water samples and 6 samples were collected from bore wells located at various villages within the 5km radius of the proposed project site. Ground water samples collected from six locations within the study area showed compliance of all parameters with the drinking water standard of IS 10500.

4.1. Data Collection

Different data products required for the study include Survey of India (SOI) toposheets bearing with numbers 65C/6,7,10,11on 1:50,000 scale. Fused data of IRS–1D PAN and LISS-III satellite imagery obtained from National Remote Sensing Centre (NRSC), Hyderabad, India. Collateral data collected from related organizations, comprises of water quality and demographic data.

4.2. Database Creation

Satellite imageries are geo referenced using the ground control points with SOI toposheets as a reference and further merged to obtain a fused, high resolution (5.8m of PAN) and colored (R,G,B bands of LISS-III) output in EASI/PACE Image processing software. The study area is then delineated and sub setted from the fused data based on the latitude and longitude values and a final hard copy output is prepared for the generation of thematic maps using visual interpretation technique

4.2.1. Spatial Database

Thematic maps like base map and drainage network maps are prepared from the SOI toposheets on 1:50,000 scale using AutoCAD and Arc/Info GIS software to obtain a baseline data maps of the study area was prepared using visual interpretation technique from the fused satellite imagery (IRS-ID PAN + IRS-ID LISS-III) and SOI toposheets along with ground truth analysis. All the maps are scanned and digitized to generate a digital output.

4.2.2. Attribute Database

In the present study area. Fieldwork is conducted and ground water samples are collected from 10 predetermined locations based on the land use and drainage network maps in the study area. Care is taken in collecting the water samples for uniform distribution and density of sampling locations. The water samples were analyzed for various physico-chemical parameters.

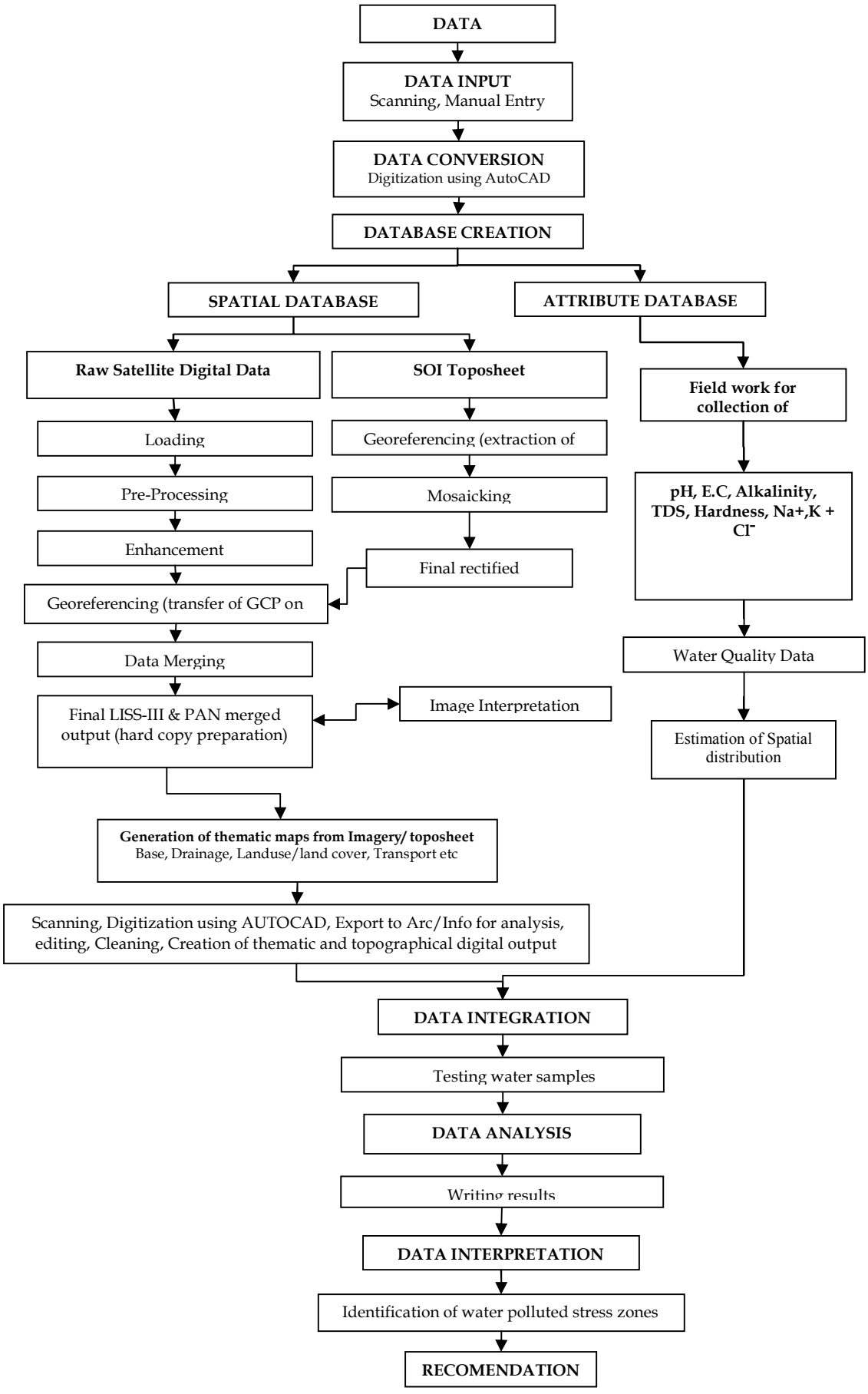

Figure 1 Flow chart showing the methodology adopted for the present study

5. RESULTS AND DISCUSSIONS

The predetermined analysis of water samples collected from the study area with help of Survey of India (SOI) toposheets bearing with numbers 65C/6,7,10,11 on 1:50,000 scale. The below table shows the locations.

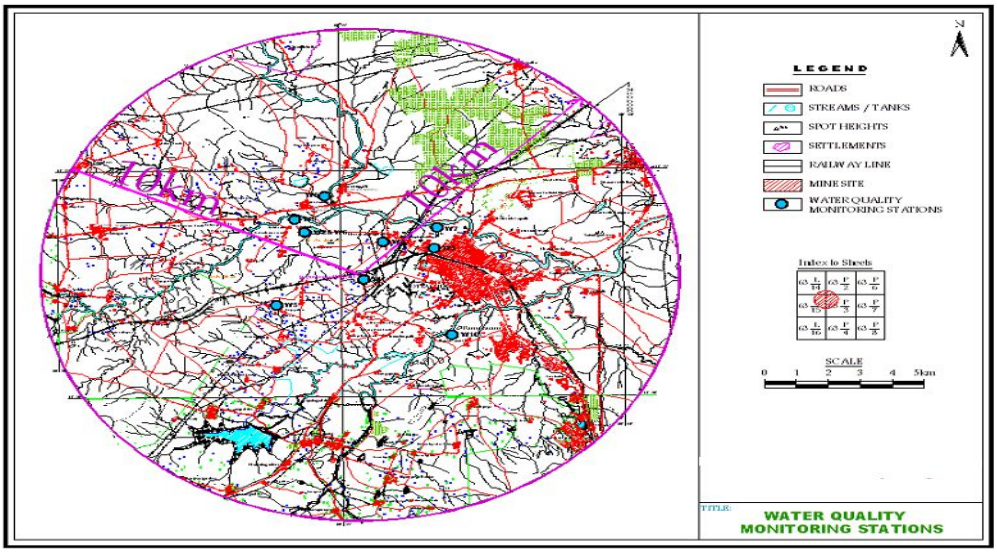

Figure 2 Samples monitoring stations

Table 1 Water samples locations

Station code	Location	Source	Distance from plant site (km)	Direction water plant site	Usage
W1	Project site	Bore well	_	_	Drinking & domestic
W2	Karakondaramavaram	Bore well	2.5	WNW	
W3	Gollagudem	Borewell	1.5	ENE	
W4	Hemachandrapuram	Borewell	1.6	NNE	
W5	Upparagudem	Borewell	2.9	WSW	
W6	Karakondaramavaram	Borewell	2.5	WNW	
W7	Gollagudemmurreruvagu D/s	Surface	2.7	ENE	
W8	Murreduvagu near bommanapalem U/S	Surface	2.5	NNW	
W9	Nallavagu near karakondaramavaram	Surface	3.2	WNW	
W10	Yaddulavagu river	Surface	3.5	WNW	

The study area water control measures will be provided in the proposed power plant to meet the regulatory standards. The environmental management and emergency preparedness plans are proposed to ensure that the probability of undesired events and consequences are greatly reduced and adequate mitigation measures are proposed in case of an emergency. The impact is generally confined to the project area and is expected to be negligible outside the plant boundaries. However, following mitigated measure will be taken to limit the environmental impact during construction phase. Regular water sprinkling will be done to avoid the dust entering into the atmosphere.

pH: During present study water pH value were found (7.5 to 8.3). It is indicating alkalinity nature throughout the study period (figure 2). The high value may be due to attributed sewage discharge by surrounding cities and thermal power plant.

Total dissolved solids: Total dissolved solid range from (602 to 2592mg/l) in different areas. Tds analysis has great implication in the control of chemical and physical waste treatment process.

Total hardness: In present study total hardness range from (400 to 1040 mg/l) in different study areas .these high values may be due to the addition of calcium and magnesium salts. The increase in hardness can be attributed to the decrease in water volume and increase in the rate of evaporation at high temperature.

Cholrides: choloride found high during the study ranged from (107.2 to 370.2 mg/l).it shows that higher concentration of choloride is associated with increased level of pollution.

All physical and chemical properties of study area were exceeded desirable limits. The results obtained from the present investigation shall be useful in future management of power plant .The physico- chemical characteristics of study area suggested that there are harmful to irrigation and drinking water.

Table 2 Results of physical chemical parameters

S.N0	Location	pH	E.C µmhos/cm	Alkalinity mg/l	Cl^- mg/l	NO_3^- mg/l	TDS mg/l	Hardness mg/l	Na^+ mg/l	K^+ mg/l	SO_4^{2-} mg/l	F^- mg/l
W1	Project site	8.26	4050	1030	370.2	150	2592	1040	290.5	270.2	333	0.3
W2	Karakonda ramavaram	7.96	1734	440	193.8	54.5	1109	490	129.7	70.9	93.1	0.3
W3	Gollagudem	7.88	1200	300	134.9	39.6	768	395	73.6	39.7	76.8	0.2
W4	Hemachandrapuram	7.58	1652	380	175	115.2	1057	440	120.5	94.7	95	0.3
W5	Upparagudem	8.2	1243	310	135.6	42.1	795.5	390	78.2	47.5	86.4	0.3
W6	Sarvaram	7.86	1845	420	223.3	117.1	1180	490	156.4	72.5	91.2	0.3
W7	Gollagudem murreru vagu D/S	8.2	1098	310	112.8	19.22	602	370	59.8	38.2	43.2	0.2
W8	Murredu vagu near bommanapalem	7.95	1085	290	107.2	21.7	649	390	55.2	25.7	57.6	0.2
W9	Nallavagu near karakonda Ramavaram	8.36	1275	330	107.8	30.9	658	400	63.4	39.9	50.6	0.2
W10	Yaddula vagu	8.2	1260	330	101.3	32.7	668.4	390	62.8	38.75	57.7	0.3

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